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THE  
**Journal of the Society of Arts,**  
 AND OF  
**THE INSTITUTIONS IN UNION.**

110TH SESSION.]

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**Announcements by the Council.**

EXAMINATIONS, 1865.

The Programme of Examinations for 1865 is now ready, and may be had gratis on application to the Secretary. A copy has been sent to each Institution and Local Board.

**Proceedings of the Society.**

EXAMINATION PAPERS, 1864.

The following are the Examination Papers set in the various subjects at the Society's Final Examinations, held in April last:—

(Continued from page 664.)

ENGLISH HISTORY.

THREE HOURS ALLOWED.

1. What were the principal divisions of Britain in the ninth century?
2. Explain frank-pledge, folc-land, socage, alod, escuage, tallage, subsidy.
3. Give, with dates, a short history of the reign of Henry III.
4. Write a short life of Becket, *or* of Wolsey, *or* of William III.
5. What were the chief articles of the Petition of Right?
6. Compare the powers of the crown in the reigns of Edward III., Elizabeth, Charles II., and Anne.
7. What was meant by the "dispensing power" of the Crown? Give instances of its abuse, and state whether it has been abolished.
8. Give a short history of the Puritan party.
9. What were the chief Acts passed in the reign of Charles II?
10. Describe the trial and execution of Lord Stafford.
11. Write a short life of Sir Robert Peel.
12. Describe minutely any one battle.

ENGLISH LITERATURE.

THREE HOURS ALLOWED FOR THE TWO AUTHORS SELECTED BY THE CANDIDATE.

CHAUCER.

(PROLOGUE TO THE CANTERBURY TALES.)

SECTION I.

1. A good man was ther of religioun,  
And was a pore persoun of a toun;

But riche he was of holy thought and werk.  
 He was also a lerned man, a clerk  
 That Christe's gospel gladly wolde preche;  
 His parischens devoutly wolde he teche.  
 Benigne he was, and wonder diligent,  
 And in adverseite ful pacient;  
 And such he was i-proved ofte sithes.  
 Ful loth were he to curse for his thythes,  
 But rather wolde he geven out of dowte,  
 Unto his pore parisschens aboute,  
 Of his offrynge and eek of his substance.  
 He cowde in litel thing han suffisance,  
 Wyd was his parisch and houses fer asondur,  
 But he ne lafte not for reyne ne thondur,  
 In siknesse ne in meschief to visite  
 The ferrest in his parissche, moche and lite,  
 Uppon his feet, and in his hond a staf.  
 This noble ensample unto his sheep he gaf,  
 That ferst he wroughte, and after that he taught,  
 Out of the gospel he the wordes caughte,  
 And this figure he addid yit therto,  
 That if gold ruste, what schulde yren doo?

(a) Express the sense of this passage in prose, by changing every obsolete expression for a modern one, and putting the words in each sentence into their simple order, so as to add as little as possible to the number of the words.

(b) Select each word which requires to be pronounced differently from modern usage to make out the verse, and mark how it must be sounded.

(c) Explain each peculiar construction.

2. Give a short account either of the Nun, the Knight, or the Pardoner, using any of Chaucer's own words which you can recollect.

3. Explain these words—*achatour*, *somdel*, *forby*, *algate*, *acate*, *vernicle*, *yelwe*, *altherbest*, *everichon*.

4. In what respects does the grammar of Chaucer mainly differ from modern usage?

SECTION II.

1. Sketch the general plan of the Canterbury tales.
2. Name the other principal works of Chaucer.
3. What is known of Chaucer's early life?
4. Who were the most famous writers in English who lived in the same century as Chaucer, and which were their chief works?
5. Give some account of the sources from which Chaucer took many of his stories.

SHAKSPERE.

(KING LEAR.—RICHARD II.—THE MERCHANT OF VENICE.)

SECTION I.

- (a) My wind cooling my broth  
Would blow me to an ague, when I thought  
What harm a wind too great might do at sea.  
I should not see the sandy hour-glass run  
But I should think of shallows and of flats;  
And see my wealthy Andrew dock'd in sand,  
Vailing her high top lower than her ribs,  
To kiss her burial.
- (b) O reason not the deed: our basest beggars  
Are in the poorest things superfluous:  
Allow not nature more than nature needs,  
Man's life is cheap as beast's.
- (c) O, who can hold a fire in his hand  
By thinking on the frosty Caucasus?  
Or cloy the hungry edge of appetite  
By bare imagination of a feast?  
Or wallow naked in December snow  
By thinking on fantastic summer's heat?
- (d) Needs must I like it well; I weep for joy,  
To stand upon my kingdom once again.  
Dear Earth, I do salute thee with my hand,  
Though rebels wound thee with their horses' hoofs.
- (e) —This is some fellow,  
Who, having been praised for bluntness, doth affect  
A saucy roughness; and constrains the garb  
Quite from his nature—
- (f) How far that little candle throws his beams!  
So shines a good deed in a naughty world.

1. In what connexion does each of the above passages occur?
2. Express the sense of *a*, *b*, and *c* in simple prose as briefly as you can.
3. Notice every old word, or word used in an obsolete sense, and every peculiar construction.

SECTION II.

4. Compare the characters of Kent and Glo'ster; or those of Richard II. and Lear.
5. From what sources did Shakspeare take the stories of King Lear and the Merchant of Venice.
6. What deviations from historical fact are there in Richard II.?
7. State what you know of the history of the texts of these three plays.
8. Give some account of Shakspeare's life before he went to London.

BACON.

(ESSAYS.)

SECTION I.

1. Give the substance of the essay, "Of Simulation and Dissimulation." How far do you agree with the principles expressed in it?
2. Explain the following passages, and notice anything which is peculiar in the words or constructions:—  
"In place, there is license to do good and evil; whereof the latter is a curse; for in evil, the first condition is not to will; the second not to care."  
"Princes are like to heavenly bodies, which cause good or evil times, and which have much veneration but no rest."  
"Glorious men are the scorn of wise men; the admiration of fools; the idols of parasites; and slaves of their own vaunts."
3. How does Bacon distinguish between *goodness* and *goodness of nature*?

4. Give an outline of the essay "Of Envy," or that "Of Seeming Wise."

5. "The Kingdom of Heaven is compared, not to any great kernel or nut, but to a grain of mustard seed, which is one of the least of grains, but hath in it a property or spirit hastily to get up and spread." What use does Bacon make of this illustration?

6. "To seek to extinguish anger utterly, is but a bravery of the Stoics." Explain these words. What cautions are given in the essay in which they occur for the due restraint of anger?

7. Explain Bacon's use of the following words—*zelant*, *tracts*, *vein*, *regress*, *percase*, *ocs*, *meliority*, *laudatives*, *knap*, *imbise*, *coemption*, *chapman*.

8. Give some of the words of very common occurrence which were used in a different sense in Bacon's time from that in which we use them.

SECTION II.

9. Name the principal works of Lord Bacon.
10. Give an account of the first publication of the Essays and of the most important editions of the work.

CRAIK.

(OUTLINES OF THE HISTORY OF THE ENGLISH LANGUAGE.)

1. "Most commonly the effect produced by one language upon another is confined to the vocabulary. It is very rarely that two distinct grammatical structures become intermixed." Show the bearing of this statement upon the history of the English language.

2. Give some account of the two great dialects of the French language at the time of the Norman Conquest. In what way did each influence the formation of the English language?

3. State the historical doubts regarding the Jutes.

4. Illustrate, by means of a table, the relation in which the Gothic languages stand to each other.

5. To what classes do those words belong which the English language has taken directly from the Latin? Give examples.

6. Explain the term *Semi-Saxon* and give an account of Layamon's Brut.

7. In what respects did the early English mainly differ from the Semi-Saxon? What is the *Ormulum*?

8. In what way did the use of French become extinct in England?

9. What particulars chiefly distinguished the grammar of the middle English from that of modern English?

10. Explain the terms—*Danelagh*, *Limes Saxonius*, *Lingua Franca*, *Romance*, *Romaic*, *Neo-Latin*.

(To be continued.)

Proceedings of Institutions.

PEMBROKE DOCK MECHANICS' INSTITUTE.—The fourteenth annual report, to July, 1864, states that in the condition of the Institute there is a steady improvement; the total number of members at present is 285, showing an increase of 13 during the last twelve months. Upwards of 60 members have, since 1862, kindly volunteered an annual subscription of two shillings, in addition to their regular subscription, amounting to £16 2s. 6d., to be devoted entirely to the building fund. In reference to the annual examination in connection with the Society of Arts, the Committee state that the number of candidates for this year, and also the number of certificates obtained by them, are in excess of former years, testifying to the increasing interest taken by the members in these most impartial educational tests; and, if an educational scheme, in connection with the Institute, were properly developed,

a still further increase in the number of candidates would ensue. Eighteen certificates were awarded to the ten members who passed the examination this year, one of whom succeeded in gaining the first prize in geography. Intending candidates are informed that a selection of the text books, recommended by the Society of Arts has been added to the library, and their attention is specially called to the Examiner's remarks in the *Journal* for the week ending June 24th; and further information may be obtained on application to any of the members composing the local board.

#### GAOL DIETARY—THE OPERATIONS OF THE RECENT COMMITTEES.

By EDWARD SMITH, M.D., LL.B., F.R.S., Assistant-Physician to the Hospital for Consumption, Brompton.

(Continued from page 670.)

##### WHAT THE COMMITTEE HAVE DONE.

So far I have regarded the operations of this Committee negatively, and have quoted their statements as to the parts of the inquiry which they have left undone. I now proceed to show what has been done.

The Committee state, on page 24, "that we do not hope to obtain any information applicable to our purpose from direct experiment. But what we cannot get from experiment we may hope to arrive at by experience." This is the ground on which they have proceeded, placing on the one hand *experiment*, or as they elsewhere state *theory*, and on the other *experience*; on the one hand precise knowledge, if they had known how to obtain it, and on the other common observation, with all its gradations of trustworthiness, instead of using experiment for the purpose of acquiring scientific information on subjects with which science alone could deal—as the effect of confinement and the necessity for certain ingredients in the food, and the experience well selected as to the general effect upon health and strength.

The first step which they take is to *assume* a basis for the dietaries, viz., the fitness of the present scheme of dietary. After commenting upon the dietaries of 1843, and stating (p. 27) that it is quite impossible to study this table without coming to the conclusion "that Sir James Graham did unconsciously introduce a strong penal element into classes 1 and 2, and a slight element of luxury into class 5," and after stating on page 28 "they are strangely anomalous and eminently unsatisfactory," they add to the first sentence their conclusions—"We shall to a certain extent take them as our guide. We shall assume that criminals sentenced for short periods of imprisonment are not only to have less food than those sentenced to longer periods, but that the food ought to consist of few elements, and those not of the most attractive character." They *assume* as their starting point that there shall be different scales of dietary in prisons, which must mean, if it have any scientific value, that they *assume* that there is an effect in confinement which demands increase of food as the imprisonment endures. But such a fact cannot be allowed to rest upon an assumption; it is the very fact which Sir George Grey informed them was to be proved by experiment. Having then assumed that there should be different scales of food, it was an easy matter to assume that the existing plan of five classes was the right one, and they at once adopt it, and thus place on *assumptions* the whole framework of the scheme of dietary.

The next step was to appeal to *experience*, as they state, and a series of questions was drawn up Dr. Guy and forwarded by the Home Office to the Visiting Justices of Prisons to ascertain the dietary in use, and their views as to its fitness, and he appends a list of diseases which he states are "usually ascribed to insufficient diet."

The schedule which is annexed is based upon the Government scheme with its five classes and defined

durations of improvement, and no provision was made for returns upon any other scheme. This at once indicated that the framers were quite unacquainted with the system pursued in county and borough gaols, for in the return, entitled "Dietaries for Convicts, &c.," issued by the Government in 1857, out of eighty-six county gaols forty did not conform to the Government scheme, either in number of classes of dietaries, or in the different durations of imprisonment to which each class was appropriated. How then could any return be made by these non-conforming gaols in the schedule forwarded to them? It is also stated by the Committee, that of one hundred and forty county and borough prisons sixty-three still use, with approval or disapproval, this scheme, but I believe this number included some gaols which, having accepted the scheme of diet, have varied the duration of imprisonment attached to them, and so far are non-conforming. Hence it follows that no accurate returns could have been made upon the schedule from one-half of all the gaols in the kingdom, and if they had been made in any other mode, they could not have been analysed with those of the conforming gaols.

The statement as to the diseases which they say are ascribed to insufficient diet is *theoretical* enough. Thus diarrhoea, which is a seasonal disease or due to improper and excessive food; dysentery, which is almost unknown in this country; scurvy, which has almost universally disappeared; scrofulous enlargements, which depend upon constitutional taint; boils and carbuncles, which occur among rich and poor alike,—are cited as such diseases, and this in reference to dietaries which extend over so short a period as from seven days to twenty-one days, for in these alone can there be any grave suspicions of great defect in food. Such questions could never have been proposed by one familiar with the short sentences in county gaols, however singularly they may have occurred to one accustomed to the long imprisonments in convict prisons, and unduly impressed with the historical fact of an outbreak of scurvy which occurred at Milbank forty years ago. The only question which has any value in it is that of general failure of health and strength; but it must occur to every mind, that so general a condition must be one very difficult to define—impossible in the short period to which the lowest class of dietaries refer, and to Visiting Justices, who are required by law to see the prisoners three times in a year, or to surgeons who do not devote their whole time to the duties of the gaol, and whose visits in the absence of evident disease would be little more than formal. Such an inappropriate list of questions could only be answered negatively, and no information showing the sufficiency or insufficiency of the dietary could be derived from them.

The Committee were directed to frame dietaries "which should be sufficient and not more than sufficient for the maintenance of health," and instead of finding the proof which the conditions require, they hand on the exact words to the Visiting Justices, and, after seeking their opinion, ask if any of the dietaries in use in the particular gaol are, in their opinion, more than sufficient or insufficient for that purpose; and upon the replies to these questions, the whole report and the whole procedure (after the *assumption* of a basis as above stated) of this Committee is based. Not one proof do they themselves work out—not one subject do they explore—not one fact do they of their own labour add to knowledge; so that the Visiting Justices of Prisons are accepted as the highest authorities on the dietary questions in prisons, and on their views alone is the existing scheme to be maintained or a new one devised. If this had been the view held by the Committee of the House of Lords, or by the Home Secretary, it would not have been necessary to recommend the appointment of a Commission, which was intended to have included in it the best informed men of the day upon an abstruse and eminently scientific question; neither need Sir George Grey have selected medical men, whether specially acquainted with the subject or not, for no talent

was required to draw up a series of questions such as those proposed to the Visiting Justices, and a clerk would have been far more fitted to have analyzed the replies.

It would be idle to stay to show that the Visiting Justices have no claim to, and would repudiate this position, and would at once defer their views on the scientific aspects of the question to those whose scientific training and medical education alone fit them to undertake such a work. But it may be added, that the opinion of the medical officers of the different gaols was also sought, and that they are competent to advise, and would guide the Visiting Justices. The medical officers are referred to only incidentally, and considering that the questions were framed by medical men, I may add very superciliously. No direct reference was made to them—no questions were proposed to them, nor was any schedule forwarded to them by the Committee, but the remark is appended to the questions addressed to the Visiting Justices:—"You are requested, before answering these questions and filling up these forms, to consult with your medical officer, who will state whether he concurs with you in the answers given." Notice the secondary part which the surgeon is asked to play—the opinion of the Visiting Justices on dietary is of so much value that questions are specially addressed to them; but that of the medical man whose education has had reference to this very subject, and to whom the Justices must look for advice on questions of health, is of so little moment, that it is left to the Justices to ask for it or not at their discretion. A medical man having a right view of his own position would decline such a reference; or, taking lower ground, would hesitate to express an opinion adverse to that of the chairman of the Visiting Justices who might choose to ask his concurrence.

If, therefore, with the present defective arrangement in gaols, by which a medical man in general practice is appointed the medical officer of gaols, and can devote only so much of his time and attention to the prisoners as may be necessary to treat their diseases, the opinion of such medical officer could not command implicit faith, the mode in which this Committee have thought fit to ask for it deprives it of any value apart from that of the Visiting Justices. It would be interesting to learn in what proportion the surgeons to the 140 gaols have expressed an opinion adverse to that of the Visiting Justices.

It is impossible to discuss with any satisfaction the analysis of these returns, which constitute the body of the report, without having the details upon which the analysis is founded, for it follows from the large number of non-conforming gaols, that the analysis must have been made upon returns which could not be treated in one analysis, and that the results are erroneous, or that the analysis has been made upon the experience of only a part of the gaols. In the analysis of the separate classes, which commences on page 35, only a minority of the gaols is included, for in the first class only 24 prisons are cited, whilst the non-conforming gaols amount to from three to four times that number. Yet upon such an analysis the results are founded, as in the very class in question (class 1, bread and gruel dietary), in which the Committee state that "a glance at the table will show that the diet in this class is more frequently deemed defective than excessive, and that where additions are made they are often on a very liberal scale."

The analysis of the returns as to the question of diseases, which the Committee say are attributed to defective diet, states, that the question as to general failure of health and strength (the word "general" being there italicized by the Committee) was, "by a majority," "answered in the negative;" that as to boils and carbuncles "may be at once dismissed;" scrofulous diseases were also "comparatively of rare occurrence;" diarrhoea "furnishes no indication that the dietaries are deficient or defective;" scurvy (on which and its supposed preventive, potato, the Committee is great) had "formerly" oc-

curred or "seldom" occurred in eight gaols so long ago as 1845 or 1847, or "formerly occurred," or occurred "some years since," but, as must have been expected by any one acquainted with our present public dietaries, does not now occur; yet the Committee take credit for the forethought which dictated the inquiry, for they state, "Among the diseases which have been attributed to deficient or defective food, *scurvy* holds the first place, and we were, therefore, prepared to expect important information from the return under this head. We have not been disappointed. The above is the "important information" which they state they have received; and as the returns have shown that no scurvy exists under the present scheme, they recommend an addition to the "potato element" in their new scheme dietary!

The analysis of the returns on the question of health and strength is extended, and yet out of 140 gaols the replies of only 19 gaols are cited, some affirming and explaining, others denying the occurrence. Hence the result of this series of queries is as unimportant as the value of the queries would have led us to expect.

The subject of loss or gain of weight is discussed at length, but with exceedingly few data, and the analysis is made upon an erroneous assumption of the present opinion upon the value of weight, for it is clear that variations in weight under a given dietary will occur with age—the period of growth—weight on entering the prison—the labour exacted—the varying effect on the spirits and health by imprisonment—the power of digestion and assimilation of a given and probably unusual dietary—the season of the year, as proved by Mr. Milner, *as well as* the quantity of food which is supplied. Yet the Committee begin their remarks by the statement: "As the weight of prisoners is believed to supply a very precise and definite test of the sufficiency of our dietaries;" and having thus set up a test which nobody allows to be without fallacy, they easily find returns which show its untrustworthiness. Yet even here a very small minority of the gaols—only 6 out of 140—are thought sufficient for the discussion, and from these they show "that weight of body varies with work performed, with the diet supplied, with the weight of body on entering the prison, and with short as well as long periods of imprisonment." They also import into the argument certain isolated and exceptional results, as that at Millbank (which is not a county gaol, and in which the conditions are quite different from those of county gaols) there was gain and loss alternately. At Pentonville (also not a county gaol) and Glasgow there was no relation of weight of body to increase, decrease, or change of diet. (We might ask if these changes were without limit, and if there would have been any decrease of weight if the prisoners had been kept without any food, or increase if fed at an aldermanic feast?) At Wakefield those lost most who had the best diet (but all lost). At Liverpool there was a gain during the first month and a loss during the second month, and at Wakefield there was a loss over the whole twelve months.

Hence, omitting reference to the convict gaols, they quote certain returns from five county and borough prisons, viz.: Morpeth, Wakefield, Hereford, Manchester City, and Liverpool: Wakefield showing a loss in the whole twelve months; Hereford a loss in the majority on the lower and gain on the higher classes of dietary; Manchester in 1864, with the distressed operatives abounding, showing some anomalies such as stationary weight on the lowest diet—this is for persons condemned for the short term of seven days, and decrease with the better dietaries, and different class of offenders, in the second and third classes, and increase in dietaries four and five, and in a supplemental return an actual increase in class two, but decrease in the higher class three; Swansea with a general loss in the low dietaries, and Liverpool with a gain on the lowest, a loss on the second, a gain on the higher dietaries.

Hence in these returns there is a general agreement in loss of weight with the low and gain in weight with the higher dietaries; and when there is a general gain of

weight with the lowest dietary, as occurred at Manchester and Liverpool, it is manifestly exceptional, and is found in the two towns quoted with multitudes of ill-fed youths committing small crimes and suffering a few days' imprisonment. The general result of the analysis is to throw doubt upon the value of weight as a test of sufficiency of food; and whilst the Committee point out that heavy or light weight on admission, "corresponding doubtless in fact to difference of age," seems to have more influence in the gain or loss of weight than any other cause," and also show that "original equality of weight, of age, of residence in prison, of employment, and of discipline, are necessary conditions of any scientific comparison of one diet with another," they do not attempt to isolate these different classes of cases—have not obtained any new returns or made new experiments whereby they could have been separated, and the real influence of food over weight of body properly ascertained—have left the matter just as they found it, but do that which is almost equivalent to a depreciation of important evidence, for after giving great prominence to the returns from Manchester and Liverpool, with their anomalies, and after having included only five gaols in the analysis, they add in a single sentence—"though it does undoubtedly happen that some small groups of weightings which have been forwarded to us from the prisons of Peterborough, Stafford, Swansea, Winchester, Preston, Bury St. Edmonds, and Exeter, show a loss of weight in almost all the prisoners placed on the diets of the shorter sentences, with a marked gain of weight as the rule of the longer terms of imprisonment." Hence the anomalous results in two or three gaols—the general results, however, conforming—have a higher value than the returns from seven other gaols quoted, for the latter only "undoubtedly happens." Their final conclusions are, that "seeing then that the test of weight fails to a certain extent, it is obvious that we must make use of it only as one among several indications of sufficient and insufficient diet;" and again, "that gain or loss of weight is not to be trusted to as a test of the sufficiency of the dietaries." This may be true of individual cases; but on their own showing it is not correct in the aggregate, even in the gross and unsatisfactory way in which weight at different ages, &c., is taken, and certainly could not be true if the cases were selected into classes in the manner in which they have pointed out, but not carried out.

In judging of the value of dietaries this Committee have followed the precedent which its chairman adopted when he gave evidence before the Royal Commission and the Lords' Committee of last year, and which, enlarged and varied, he read at the Statistical Society, and published as a separate pamphlet for distribution—that of the gross weights of solid and of liquid food—from which it follows that as solid food is more uniform in its character than liquid food, and the latter cannot in that form be compared with the former, the real comparison of diets is made on the solid food alone, and valuable fluids as gruel, with oatmeal and treacle, milk and soup, are virtually left out of the calculation. A striking example of this evil is furnished by the very dietaries which this Committee have framed, as I shall presently show.

It is evident in a moment that to class together potatoes and meat, and bread and cheese, and estimate their value by their weight, as if they were one kind of food, is contrary to the sense of a child; and to omit reference to four ounces of oatmeal and three-quarters of an ounce of sugar or treacle in a day's supply of gruel is yet more absurd. It is true, that the mass of non-medical persons know of no other mode of computation, and with such the plan may be in some measure excused; but at this day for medical men, and much more for scientific men, to us it, is altogether inexcusable. I am quite aware that the composition of food, and the mode of calculating the nutritive elements, is not universally

known to medical men, and that the subject is abstruse and uninviting, but for some years past no chemist or physiologist has ventured to compare foods otherwise than on their chemical composition; and if gentlemen undertake to be authorities on dietary questions, it is surely little enough to ask them to make themselves familiar with the composition of food, or at least, to use tables of the constituents of foods, which may be readily obtained. I am informed that efforts are made to impress upon the minds of official men, and of influential members of the Houses of Parliament, that the composition of food is theoretical and inexact, and consequently that all calculations based upon it must be untrustworthy; and as the public is not familiar with such terms as carbon, hydrogen, nitrogen, &c., such doubts are for the present received. The Committee adopt something of this view, and depreciate the modes of calculation used by Liebig, Playfair, Lehmann, and by every chemist and physiologist of the day. They say (page 59), "The question whether the sufficiency of the dietaries of 1843 can be tested by the quantities of carbon and hydrogen assumed to be necessary for the support of the body is one of the utmost importance in its relation to the present inquiry, for if this test could be shown to be sound in itself, and really applicable to this purpose, the work of this Committee would receive the stamp of authority higher even than that of the experience upon which we intend to found them."

It is this very kind of inquiry which was required in order to determine the effect of confinement, of hard labour, and of other elements of prison discipline upon the prisoners, and which this Committee stated that they could not ascertain. Had they ascertained by exact research the amount of carbon and nitrogen which kept the body in health and strength under the different conditions of prison discipline, they would have given us that which we require, or as Professor Sharpey writes, "We are sorely in want of trustworthy data to show the absolute quantities of carbon and nitrogen indispensable for health under different circumstances—that is, data derived from experiments on human alimentation." Such experiments have been made by many, but in prison dietaries only by myself; and what is required is an extension of them to all the conditions under which dietaries are used. The method is simple and sound, and Professor Sharpey again writes, "I cannot doubt the soundness of the principle in which you propose to determine the digestibility of food in the case of persons in confinement, viz., by ascertaining what proportion of food passes from the body unused." The method is also known, and the results hitherto obtained are recorded in the *Phil. Transac.* and in the *Transactions of the Brit. Assoc.*, and the method could have been employed by the Committee, or by the aid of qualified persons. Such, however, was not their plan—they place what they call "experience" before observation.

At this point they do me the honour to refer to my labours in this field; misrepresenting my statements, and then seeking to throw ridicule upon them. I am made to say that I consider 30,100 grains of carbon and 1,400 grains of nitrogen weekly—which, when advising the Government last year, I stated to be necessary for the Lancashire operatives—as a proper quantity for prison discipline; and they then proceed to show its fallacy by supposing that in dietaries which afford less the prisoner should lose, and in those which afford more the prisoner should gain weight, and in exact proportion to the defect or excess, and over any number of days or weeks that the excess or defect is continued.

I will not occupy time in discussing the question, but will say that I have never mentioned any quantity as suited to prison dietaries, and so far from my having made such a statement as they impute to me, I expressly added in the paper from which they quote (*Journal of Society of Arts*, Feb. 19, 1864) that crank labour requires 45,000, and tread-wheel labour 60,000 grains of carbon weekly;

and in my evidence before the Lords' Committee I stated my intention to frame any prison dietaries upon a sound and final basis until further information had been obtained by experiments in prisons. Having, however, set up this standard and test, they proceed to quote the experiments on weight at Hereford, Manchester, and Liverpool, before-mentioned, to show that the result which they assert ought to be found, did not occur either in any degree or in the degree which they affirm to be needful. Yet, as already stated, even these, in a general sense, show that there is a gain in weight in the higher, and less in the lower dietaries—the dividing line being about the quantity which I named for the Lancashire operatives, viz., 29,588 grains of carbon and 1,323 grains of nitrogen in class 3 weekly. In the seven gaols before quoted, viz., Peterborough, &c., this was almost the uniform result. They use a test which they say is very imperfect, and which yet, despite of its fallacies, shows a general concurrence in its favour, but fails, they think, when it does not show that the average gain or loss of weight of body exactly corresponds with the defect or excess of carbon or nitrogen the food contains. As if this were not sufficient, they multiply the supposed loss or gain per week by the number of weeks of imprisonment, and this again by the number of prisoners under inquiry, and then, as at Liverpool, find that in sentences of twelve months the total gain ought to have been 1,645 lbs., whilst in fact it was 85 lbs. in one series, and 25 lbs. in another. Is it not past belief that medical men, occupying a position in which they are employed by the State, should assume it to be possible that if a man ate 1 lb. of food in excess daily, he would increase in weight by that amount, and that this weight should increase at the same rate daily for whatever time the excess of food is taken—that they should use such an argument for any purpose whatever? But as I have never made the statement which they have assigned to me, it is of little importance what arguments they use to show its fallacy; yet I may add, that such misrepresentations should not occur in State documents and scientific discussions.

It now only remains for me to state the alterations which have been made in the dietaries, and the effect of them over the total nutriment supplied.

It has been already mentioned that the general scheme is that which has been in use since 1843, viz., five classes, each referring to a different duration of imprisonment, and having a much smaller amount of food in the lower than in the higher classes. The duration of imprisonment is increased in all the classes, with hard labour, except the first; the effect of which is to prolong the low diet of the 2nd class to four weeks instead of to three weeks, and the medium diet of class 3 to three months, instead of to six weeks. Labour is not any longer regarded as equivalent to a further duration of imprisonment, but the whole dietaries are constructed on the basis of no labour, and certain additions are made for hard labour. There are also three additional kinds of food imported, viz., Indian meal pudding, or, as I judge from the quantity of fluid to be added to it, "stirabout," suet pudding, and cheese; the first in the 1st and 2nd classes only, the second in the 3rd, 4th, and 5th classes only, and the third for the Sunday's dinner only in the four higher classes. The general arrangement of the meals remain unaltered, except that universally the Sunday's dinner is rendered peculiarly uninviting by being composed of bread and cheese only—a circumstance which is likely to make the prisoners have a dread, wholesome or otherwise, of the recurrence of that day.

As to the quantity of food supplied in the five dietaries, the Committee (on p. 72) state, that if they had retained the former plan of placing the prisoner upon the diet of his class, they would simply have had "to slightly increase the dietary proper to the shorter sentences, to somewhat reduce those proper to the longer terms," but as they have determined to make the dietaries progressive, "a somewhat larger addition will have to be made to the

diets assigned to the shorter terms." Hence they intended clearly to increase the nutriment in the lowest diet, and from the remarks on page 27 it may be inferred that they intended to diminish that of the highest diet. We will now examine the result in each class in order—

CLASS 1, contained 7 lbs. of bread, 2 oz. of oatmeal, and 5½ oz. of sugar or molasses weekly, containing .....	Carbon. Grains. 19,860	Nitrogen. Grains. 889
Now there is 8 lbs. of bread, 7½ oz. of maize, 1½ lb. of potatoes, and 12 oz. of skimmed milk, containing.....	18,834	838

So that the substitution which they have made has resulted in lowering this lowest class to the extent of 1,000 grains of carbon and 50 grains of nitrogen, instead of making, as they said, "a somewhat larger addition." This *reductio ad absurdum* is doubtless owing to the fact of disregarding the fluid food, and comparing the dietaries upon the solid food, whilst the gruel contained nutriment, which as bread was equal to 46½ oz., or nearly 3 lbs. weekly. Thus the weight of solid food in ounces in their dietaries assumes a progression as follows, without labour:—

	CLASS 1.	CLASS 2.	CLASS 3.	CLASS 4.	CLASS 5.
New scheme ...	170	190	230	267	306
Old scheme ...	112	168	210	212	282

Whilst in the old scheme it was with and without labour. This table shows their intention to increase the low diets.

It is also to be observed that whilst the commitments under this class are usually with hard labour (and wherever the crank or the treadmill exists that will be the labour supplied—the hardest labour known), no provision for food is made for such an one over that of the prisoner confined without labour, whilst doubtless the waste of system is in the one case double that of the other. The importance of this may be properly estimated when I quote from the returns of farm labourers, obtained by the Government, which show that the average quantity per adult, male and female, and including in that term all children above ten years of age, in the worst fed county of England, is more than 33,000 grains of carbon and 1,190 grains of nitrogen weekly.

The committee have felt these low dietaries to be a weak part of their scheme, for on page 72 they take much pains to excuse their conclusions. They say "it is true that these diets of the shorter sentences do not satisfy the requirements of theories based on experiments made upon persons very differently circumstanced, and that they are open to adverse comment from those who, not satisfied with the absence of disease and the preservation of health, insist also that the prisoner shall suffer no loss of weight. But the facts placed at our disposal have satisfied us that scientific data have but a limited and uncertain practical application, and that gain or loss of weight is not to be trusted as an indication of health or as a test of the sufficiency of our dietaries." It will be observed in this passage, that whilst they reject scientific data, which (as they could not use them to determine the effect of confinement or labour or any other agent committed to them for inquiry) it is likely that they should do, they did not use the knowledge upon which scientific data would be based—that of the dietary of free labourers or of paupers in workhouses—as they were directed to do, but which they said they could not ascertain. They place their whole argument upon an *assertion* which, as they were not familiar with county gaols, they could not base upon their own knowledge, viz.: that health was maintained under these circumstances; and they throw aside the evidence of loss of weight (which their own statements had shown to almost universally occur to a considerable extent), that is, they do not use the means of proof open to the scientific man on the one hand, and to the non-scientific man on the other—neither science

nor experience—but act on an assertion which they could not make on their own knowledge. It is repugnant to common sense, and if it yet be true, should have been proved on the best known method, that adults in prison working the crank or the tread-wheel and losing weight almost universally (indeed at Wakefield it was found that during this first week of work at the tread-wheel and with this dietary the loss was seven pounds per man), should keep in health and strength upon a dietary but little more than half that of the worst-fed farm labourers, their wives, and children over ten years of age. Such a result cannot be allowed to rest upon mere assertion or common observation.

CLASS 2—contained 10½ lbs. of bread, 28 oz. of oatmeal, and 5½ oz. of sugar or molasses, and furnished weekly .....

Carbon  
Grains.  
26,748

Nitrogen  
Grains.  
1,211

The Committee have reduced the bread by 2½ lbs. and the oatmeal by 14 oz. They have omitted the sugar altogether, and in their place have supplied 16 ounces of skim milk, 1 oz. of cheese, 36 oz. of potatoes, and 10 oz. of maize, and have reduced the nutriment to ..... thus causing a loss of 4,300 grains of carbon and 180 of nitrogen weekly.

22,468

1,031

For hard labour the old system provided only 1 pint of soup per week, in addition to the dietary without labour, which was manifestly adding insult to injury; but this Committee have made the insult greater by omitting the soup and giving 1 oz. of cheese for the Sunday's dinner. But as they had taken away from the former scheme 1 pint of gruel daily, they now restore it with hard labour, and then the nutriment becomes ..... thus lessening the diminution to about 1,000 grains of carbon and 100 grains of nitrogen weekly. This dietary is, however, on the average, not more than three-quarters of that of the worst-fed agricultural labourer.

25,813

1,121

So much for the low dietaries. Let us now show the effect of the changes upon the highest dietaries.

CLASS 5—contained 9 lbs. 10 oz. of bread, 16 oz. of separated cooked meat, 22 oz. of oatmeal, about 4 oz. of sugar, 3 pints of soup containing meat and dry and fresh vegetables, 7 lbs. of potatoes, and 3 pints of cocoa, containing 5½ oz. of sugar, and offered in nutriment weekly ...

36,603

1,610

The new dietaries contain 1 lb. more bread, 6 oz. more oatmeal, 3 oz. of cheese, 14½ oz. of flour, 3½ oz. of suet, the same quantity of soup (containing meat and bone, fresh and dried vegetables), and if I read the table right, 2 oz. of molasses, which afford ..... or an increase of 370 grains of carbon and 40 grains of nitrogen weekly.

36,776

1,649

With hard labour, which after six months—the period to which this class belongs—is never tread-wheel or crank labour, and does not differ from that of an ordinary trade; 4 oz. of cooked meat, equal to 6 oz. of uncooked meat, is given twice a week in lieu of 12 oz. of suet pudding, and 1 oz. of cheese is given extra on

Sundays, and 2 oz. of peas in place of 1 oz. of barley in the soup thrice a-week. This variation adds only 800 grains of carbon and 140 grains of nitrogen per week—supplying (with 2 oz. of molasses) .....

Carbon  
Grains.

Nitrogen  
Grains.

37,500

1,790

Class 4 of the old dietaries supplied .....

33,782

1,566

The new differ from class 5 in supplying 2 oz. of bread less, 1 oz. of cheese less, and 1 lb. of potatoes less, and only 1 oz. of molasses weekly, and contains .....

35,996

1,605

The same substitution for hard labour is made as in class 5, and the diet contains .....

36,257

1,733

Thus the higher classes are made higher than in the old dietaries, and the extra allowance for hard labour is only 700 grains of carbon in class 5, whilst in class 4 there is an addition only of 260 grains of carbon supplied, with hard labour.

Of the intermediate class—that corresponding very closely with the diet which I thought to be necessary for the Lancashire operatives, and that of the actual dietary in towns—there is an increase in the new dietaries of 600 grains of carbon and 80 grains of nitrogen, and the addition which the Committee make for hard labour is only 400 grains of carbon weekly.

Thus the Committee neglecting, nay, avowedly discarding scientific data, and guided by their ever-failing test—*experience*—have, whilst making the low dietaries higher, made them lower, and whilst making the higher dietaries lower, have made them higher; and, under the belief that they had made substantial additions of food for hard labour, have, by withdrawing other valuable food, increased these dietaries to a degree which is purely nominal. A striking illustration this of the value of their guide!

#### THE PRESENT STATE OF THE QUESTION.

Such having been the labours of the Committee, what is the present state of the question?—

1. It was desired to know, in order to support health, strength and capacity for labour, whether more food is needed in confinement than in freedom.
2. Also whether the quantity of food must be increased as the confinement endures.
3. Also whether the quantity of the food must be better in confinement, and particularly in prolonged confinement.
4. Also whether the vital powers, and particularly those of digestion and assimilation, are so impaired that a higher quality of food can alone be digested, or a lower quality being given an undue portion passes from the body unused.
5. Also the smallest amount of food required by an average man without labour.
6. Also whether the conditions of confinement can be so far assimilated to those of freedom, and particularly by adding exertion in the open air, that if questions one to four should be answered affirmatively the required excess can be dispensed with.
7. Also what is the effect of the various kinds of hard labour upon the waste and nutrition of the body, and the amount and kind of food which will exactly meet that waste.
8. Also whether meat in any quantity is necessary for any and for various terms of imprisonment.
9. Also whether meat may be wholly or partially supplanted by skimmed milk and cheese, or both.
10. Also whether fats may be wholly or partially supplanted by starchy food, for any and for every term of imprisonment.

It is to be observed that there is no class, nor any considerable portion of any class, of operatives in



this country which does not obtain meat in some form, and separated fats. Even in the worst-fed counties, the average consumption by farm labourers and their families was  $5\frac{1}{2}$  ounces of meat or bacon, or both, and nearly three ounces of separated fats per adult male and female and child were obtained weekly.

11. Also the digestibility of various foods in confinement.

*Sir George Grey's Committee have left all these questions precisely as they found them, and the information is still desired.*

12. We had a scheme of dietary supplying at one end scarcely half the food of the lowest-fed class of free labourers, and at the other the food of the well-fed operatives in towns, without proof having been obtained that the former could be borne without injury to health, and that the latter was necessary.—It is so now.
13. Also that five scales of dietary were necessary without having proved that confinement demands increasing food.—It is so now.
14. Also an addition was made to the dietary for those condemned to hard labour, whilst they might be employed in occupations the most diverse in their effect upon the waste of the body—the same addition being given for all the varieties of hard labour.—It is so now.
15. Also additional food for hard labour was not made in the lowest classes of dietary with deficient food, and when in almost all prisons it is of the most severe kind; but in the higher classes with probably abundant food, and when the labour is scarcely ever of the severe kind.

*All these remain precisely as before.*

16. Also the addition for hard labour was, so far as it went, substantial, but now it is only in substitution of other foods.
17. Also the low dietaries were affirmed to be too low to sustain health and strength.—They are now made lower.
18. Also the higher dietaries supplied meat daily. The new ones give it with hard labour (which is the usual sentence) five times a week. They were also affirmed to be higher than that of free labourers and of workhouse dietaries. They are now as high or even higher.
19. Also the prisoner was at once put upon the dietary of his class, so that if he were condemned to any period beyond three weeks' imprisonment he obtained the fair average dietary of the operatives in towns, and in most cases would retain his weight and strength, and it was only for comparatively short periods that the insufficient food was given, after which he would get the advantages of freedom. Now, all prisoners must be very insufficiently fed for one week, and insufficiently fed for four weeks, during which they will generally lose in weight and strength—a loss which is to be made up with the better dietary at a later period. As the low diets are certainly much lower than the diets of the worst fed men in freedom, it is probable that the effect of this change will be disastrous. Had the low diets been only barely sufficient to maintain weight and strength, the system of progressive dietaries might have been added, but it would not then follow that the prisoners would need the higher dietaries.

As a concluding remark it must be noted that the Committee have taken great care to shield themselves from blame in the event of their recommendations proving to be injurious to the health of the prisoners.

I have mentioned the proviso appended in reference to labour, viz., that if the dietary which they recommend

should be found insufficient to maintain health and strength, the labour is to be brought down to the dietary! In their conclusions (page 76) they add further, "that prisoners sentenced to hard labour should not be required to work at times, or under circumstances which would be deemed injurious to the health of free labourers, and that they shall not be required to do any work which in duration and severity would necessitate in any working man an abundant and highly nutritious diet." That is, they provide a dietary for hard labour, but as it may not be a right one, there is to be no hard labour at all in the sense in which it is generally understood, viz., a day's work at the tread-wheel or the crank!

As to the directions in reference to progressive dietaries, they append the remarkable proviso:—"Also that it shall be the duty of the medical officer to see every prisoner on admission, and certify his fitness or otherwise to be placed upon the several dietaries in succession, and that if the prisoner be found unfit, it shall be incumbent upon the medical officer to indicate the dietary upon which he shall be first placed."

Thus of their *proprio motu*, without the experiments which Sir George Grey informed them were requisite, and on their own affirmation, that "it is not a question of health but of discipline," they decree that the dietaries shall be progressive, and frame the whole scheme upon that decision—making, as they say, on that ground more abundant addition to the low diets, and then throw the whole responsibility of this act, as also that of the injurious results of their dietary with labour, upon the medical officer of the prison, and leave him at his peril to do as they had recommended!

Is it simplicity which is here and throughout the report so strikingly exhibited by the Committee?

Hence I venture to affirm that the late inquiry has left the whole question practically as it found it, and has afforded still stronger grounds for the issuance of a Commission of men competent to undertake such a duty as recommended by the Committee of the House of Lords.

There are still the same grounds as before to believe that the low dietaries are too low and the high dietaries unnecessarily high, to maintain health and strength; that only one scale of dietary is necessary for the maintenance of health and strength in confinement (varied somewhat in different parts of the kingdom) without hard labour; that a proper addition can be made for each kind of labour; that a certain amount of labour may be economically employed to lessen the necessity for the use of the richer foods by causing the complete digestion of the cheaper foods, and that the whole scheme can be both simplified and placed on a sound scientific basis.

#### EXHIBITION OF JET ORNAMENTS.

An attractive exhibition of jet-ornaments was held in St. Hilda's-hall, Whitby, on Tuesday and Wednesday, the 30th and 31st of August, under the auspices of the Whitby Institute. The importance of cultivating refinement and correctness of taste amongst the young workers in jet induced the directors of the Mechanics' Institute to offer prizes for the best designed and most successfully executed ornaments of that material. The first exhibition, held last year, was highly pleasing and encouraging in its results, and showed how much the capabilities of the trade might be developed by the introduction of novel designs and a better educated taste. The jet trade affords permanent and lucrative employment to a very large proportion of the adult and youthful population of Whitby, and the usefulness of an effort to give something of an artistic character to the productions of our local jet-workers is admitted on all hands. Mr. Thompson, M.P., has from the first taken a lively interest in the success of the movement; and the Marquis and Marchioness of Normanby also kindly lent

not only their patronage but their cheerful assistance. The Society of Arts places £10, as a prize, at the disposal of the Institute to be competed for. The exhibition of this year was in every respect more brilliant, as well as more successful, than its predecessor. The hall was thronged by gay and fashionable groups of spectators; pictures and works of art decorated the walls; and some of the principal jet-manufacturers displayed the choicest of their goods. The competitors for the prizes were more numerous than at the previous exhibition; and the beneficial influence of the competition showed itself in enhanced beauty both of design and execution. The judges were the Marchioness of Normanby and Mrs. T. Bagnall in Class 3; and in the other classes Capt. Percival and Messrs. T. Turnbull, sen., and W. Stonehouse undertook the duty. The following were their awards:—

Class 1.—Prize of £10 offered by the Society of Arts, for the best set, comprising brooch, bracelet, and ear-drops of uniform pattern, John Speedy.

Class 2.—For the best brooch of any value, £3. 1st prize, John Speedy; 2nd, John Thornton, £2; 3rd, T. Kingston, £1. For the best bracelet of any value, £3. 1st prize, W. Lunn; 2nd, T. Kingston, £2; 3rd, Garbutt and Warnock, £1; For the best pair of ear-drops, £1. 1st prize, J. Short; 2nd, Jasper Bingant, 10s.

Class 3.—(Mr. Thompson's prizes).—For the best brooch of the retail value of from 10s. to 20s., £3, John Raw; for the best bracelet of the same value, £2, J. Thornton.

Class 4.—For the best brooch produced by any youth under 18 years of age, £1 10s. 1st prize, I. Greenbury; 2nd and 3rd, no competition. For the best bracelet, under the same limitation, £1 10s. 1st prize, John Sherwood; 2nd, Alexander Speedy, £1; 3rd, no competition.

Class 5.—Best miscellaneous article not eligible for competition in any other class, £3, John Speedy.

Class 6.—Special novelty prize, exhibiting any new application of jet likely to benefit the trade, £3.—The judges decided that the articles in this class did not comply with the condition.

Class 7.—Bust of the Prince Consort, prize of £4, Mr. Abraham Varley.

Of the successful competitors, Mr. John Speedy, Mr. J. Short, and Mr. Jasper Bingant are in the employment of Mr. Charles Bryan. Mr. Thornton, Mr. Lunn, and Mr. Raw are in the employment of Mr. J. D. Maule. Mr. Kingston is in the employment of Mr. Huntrods, and Mr. Sherwood is with Mr. M. G. Greenbury. Mr. Thompson, in the course of his remarks at the presentation of the prizes, suggested that the prize-articles should be purchased by the Institute, and kept as a yearly record of progressive improvement in taste and workmanship, Mr. Thompson offering to defray the cost of purchasing the prizes.

On Wednesday evening the prizes were awarded to the successful candidates in St. Hilda's-hall, the Marquis of Normanby in the chair, supported by the following gentlemen:—H. S. Thompson, Esq., M.P., C. Richardson, Esq., Field-house; C. Richardson, Esq., St. Hilda's; J. Richardson, Esq., Sneaton; Capt. Percival, T. Bagnall, Esq., G. A. Peters, Esq., Dr. Wilson, Dr. Dowson, Dr. Taylerson, and Dr. Sherwood, the Rev. John Owen, R. E. Pannett, Esq., the Rev. W. Keane, M.A., and the secretaries, Messrs. J. Corner, Ruswarp; and R. T. Gaskin.

The Marquis of Normanby, Mr. H. S. Thompson, the Rev. W. Keane and others addressed the meeting.

Peculiarly the result of the exhibition is quite satisfactory, the donations having amounted to about £20, and £32 was taken at the door.

## Fine Arts.

**THE POURTALES COLLECTION.**—This famous collection, one of the richest in Europe in antiquities and pictures, will be brought to the hammer early next year. The catalogue, which will run to 2,500 or 3,000 numbers, is expected to be ready in December. The sale is entrusted to two of the principal art auctioneers of Paris, aided by four experts, all well known to amateurs of paintings and objects of *virtu*, and will form one of the most important events in the world of art next spring. The exact date is not yet fixed.

**AMSTERDAM EXHIBITION.**—A few particulars relative to this bold undertaking, referred to in the last number of the *Journal*, will not be uninteresting. The *Crystal Palace* in which the exhibition is held, was commenced in 1860; the principal nave is nearly 370 feet long by about 100 feet broad, and connected with this there are four covered courts, each 150 feet long by 33 feet wide. Besides these there is a gallery connected with two smaller rooms or courts; these together have an area of about 2,000 square yards. The whole is surmounted by a tower on which is placed a magnificent statue, representing the Genius of Civilization holding a torch in one hand and a laurel crown in the other. Judging from a woodcut which has appeared in a journal published in Belgium, and from the reports of eye-witnesses, the Dutch *Crystal Palace* is at once light, elegant, and imposing.

**MR. BICKNELL'S COLLECTION.**—The *Crystal Palace* Company have lately added to their exhibition of pictures the collection of Mr. Henry Bicknell, which has been temporarily placed at their disposal for the benefit of the public. This collection consists of about a hundred works, chiefly sketches; and exhibited with them are ten sketches by Mr. David Roberts, which are retained by the artist as personal property, and which may be looked upon as model illustrations of his style. These pictures are shown together, in a room apart from the 1,700 pictures which make up the ordinary contents of the picture-gallery.

## Manufactures.

**IRON MANUFACTURES IN NEW SOUTH WALES.**—At the Fitzroy Iron Mines the first Australian blast-furnace will ere long be in operation, and merchantable iron from native ore will soon be in the market. It appears that there are no grounds for supposing that the quantity of iron is limited, and there is a superabundance of fuel for smelting purposes. In addition to the coal which has already been worked by the company, large fresh deposits have recently been discovered. Mr. Mackenzie, the Examiner of Southern Coal Fields, has found, about four miles from the mine, a seam of coal fully thirty-eight feet thick, and, to all appearance, of excellent quality. The seam is disclosed by the gorge of the Nattai River. This is a thicker seam than any yet found in the colony. The thickest at present worked, we believe, is at the Cardiff Mine, in Lake Macquarie, but this new seam at Fitzroy beats it altogether. The coal is too far from town to be of any value for export, but, as an almost boundless supply of fuel for local manufacturing purposes, it may be of very great value hereafter. A seam thirty-eight feet thick, after making ample allowances for the waste in taking out partings, and likewise for bands of inferior coal, will yield 30,000 tons an acre. At Illawarra he has taken up a piece of land for working a promising stratum of clay iron ore, which has already been traced for a considerable distance, and is supposed, with good reason, to underlie the sandstone so familiar to the inhabitants of Sydney, and to be identical with the stratum that reappears to the north of Sydney, at Brisbane Water. Fitzroy was the first place where iron was discovered in quantity in an accessible

place, but there was no need to have gone all that distance to have looked upon it. According to the statement in Mr. Mackenzie's published lecture, it will be found at a depth of about 100 feet at Manly Beach, and, at some greater distance, under our feet at Sydney, as the stratum dips inland. Which precise locality will be the most profitable to begin working at must be left to practical men to decide, but it is clear that there is an indefinite scope for the manufacture of iron, and when it is once begun, with results profitable enough to provoke imitation, there will be no lack of material to work upon.

**BROWN DYE FOR WOOL.**—M. Wiederhold has devised a new method of obtaining a brown dye for wool. Peroxide of manganese in fine powder is mixed with dry nitrate of soda, and heated to bright redness in a wood furnace. The brownish product obtained is dissolved in water and forms a green solution containing acid manganate of soda (chameleon mineral), which gradually becomes red. When wool is steeped in this red liquor the permanganate of soda becomes decomposed, peroxide of manganese being dissolved in the pores of the fibrous tissue. The colour obtained is stated to stand well against the effects of air and light.

**GUN COTTON.**—Messrs. Pelouze and Maurey, in a memoir presented at the last meeting of the Paris Academy of Sciences, states it as their opinion, derived from a long and careful investigation of the subject of gun-cotton, that that explosive compound, if now better known as far its composition, mode of production, and properties are concerned, is still, with regard to its employment in fire-arms, in the same position as it was in 1846. "Nothing, in fact, authorises us to believe that is possible, in the present state of our knowledge, either to prevent its spontaneous combustion or to correct in a practical manner its liability to burst the weapons at present used for gunpowder."

**CULTIVATION OF COTTON IN FRANCE.**—Attempts are being made to introduce the growth of cotton in the departments of France bordering the Mediterranean. It is now some years since experiments were commenced in the department of the Gard. The spinners of Mulhouse have reported favourably on the material produced, and it is confidently asserted that cotton may be produced not only experimentally, but for commercial purposes over the whole of the fertile and irriguous lands of the Mediterranean littoral. In 1863, MM. Fournès and Théophile Arnand devoted seven or eight acres of ground, on the banks of the Gardon, to the purpose, but two or more were not irrigated in time, and another plot was found to be too near the river, so the experiment was confined to less than five acres. The following are the principal points contained in the report on the result:—This land, principally consisting of fertile alluvial soil, was planted in the middle of April, with 150lbs. short Louisiana seed. The land had been prepared with two harrowings and a dressing, and the seed was put in rows ten or twelve grains together, in holes half a yard apart. After the first irrigation, the plants having attained the height of four or five inches, all the weaker shoots were removed, and only one left in each hole. After a second watering, when the plants had grown considerably, each was topped, and still later the long lateral shoots were removed. In the beginning of July the flowers began to appear, when the plantation was watered for the third and last time. From this time nothing was done but removing weeds. The first pods began to open at the end of September, and in October commenced the first cotton harvest in France. The plucking was done by women and children, on dry days, and was not completed till the middle of January. The total cost of cultivation is set down at just over £40, and the produce at 375 kilogrammes, value five francs per kilogramme, yielding a net profit of about £33 on between four and five acres.

**WELDING BY HYDRAULIC PRESSURE.**—A series of experiments have lately been made in Paris by M. Dupontail, engineer, in the workshops of the Western Railway, to ascertain whether iron might be welded by hydraulic

pressure instead of by the sledge hammer. The latter, indeed has not a sufficient impetus to reach the very core of the metal, while continuous pressure acts indefinitely to any depth. In the experiments alluded to, M. Dupontail caused two iron bars, an inch and a half in diameter, and heated to the welding point, to be placed between the piston and the top of an hydraulic press. The bars were welded together by this means with extraordinary ease, the iron being, as it were, kneaded together, and bulged out at the sides under the pressure. The action of the press was suspended when the part welded was brought down to the thickness of the bars. After cooling the welded part was cut through to examine the inside, which was found perfectly compact. To try it, one of the halves was placed under a forge hammer weighing 1,800 kilogrammes, and it was not until the third stroke that the welding was discovered.

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## Commerce.

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**HARVEST AND CORN TRADE.**—Messrs. J. and E. Sturge, in their circular for the 1st of this month, state that "the weather during the past month has continued warm and dry, enabling the farmers in all our early districts to finish their harvest under most favourable circumstances; but the yield is much complained of. This, we believe, has not been previously the case after a dry season during the last half-century, if ever before, and it is generally attributed to frosts while the wheat was in blossom. We had a decline in price of 1s. to 2s. per quarter early in the month, which has been nearly recovered since. How far the failure of the turnip and other root crops will affect the value of wheat remains to be seen, but the large arrivals, and consequent moderate price of Indian corn, will cause that article to be largely used for feeding. The imports of wheat and flour from America, and arrivals from the Black Sea, have again been heavy, making the total importation during the month of June 511,254 qrs., against 369,346 for May, 1864, and 553,481 for June, 1863. The number of ships on passage from ports to the east of Gibraltar, notwithstanding the large arrivals, is now nearly 600, being an increase of 100 in the month. Prices of wheat in France are declining; this would show that the crop has proved better than was expected, unless, as some think, it is to be attributed to the shortness of water keeping many millers out of the market. A little further reduction would leave a margin for shipments to England. The accounts from the countries bordering on the Baltic, for some time past, describe the weather as wet, cold, and boisterous, and that the crops, although large, are much injured by the rains. Egypt continues to import, and it is expected that Portugal will soon do the same."

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## Colonies.

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**GOLD.**—The quantity of gold-dust imported into the Sydney branch of the Royal Mint from the 1st of January to the 17th of June, 1863, for the purpose of coinage, amounted to 255,081 ounces, and the coin issued consisted of 457,000 sovereigns, and 480,000 half-sovereigns. Total value, £697,000. For the same period of the present year the receipts of gold-dust have reached 368,379 ounces, and the coin issued has amounted to 1,317,000 sovereigns. This large increase in the quantity of gold received is entirely owing to the large quantities that have been received from Melbourne and New Zealand during the last two months. The following table will show the total amount of gold dust received, and coin issued, weekly, from the 31st of March to the 17th of June, 1863 and 1864:—

1863.	Sovs.	Half-sovs.	oz.
January 1 to March 31.....	457,000	—	148,617
April 8.....	—	—	5,888
„ 15.....	—	50,000	5,674
„ 22.....	—	50,000	10,026
„ 29.....	—	25,000	9,046
May 6.....	—	50,000	6,252
„ 13.....	—	45,000	9,461
„ 20.....	—	40,000	9,319
„ 27.....	—	55,000	7,685
June 3.....	—	60,000	6,096
„ 10.....	—	60,000	8,654
„ 17.....	—	45,000	8,363
	457,000	480,000	235,081
1864.			
January 1 to March 31.....	551,000	—	161,642
April 8.....	20,000	—	9,912
„ 15.....	90,000	—	16,489
„ 22.....	48,000	—	22,208
„ 29.....	38,000	—	15,121
May 6.....	100,000	—	10,142
„ 13.....	60,000	—	34,427
„ 20.....	32,000	—	9,763
„ 27.....	80,000	—	45,198
June 4.....	68,000	—	21,362
„ 11.....	110,000	—	16,308
„ 18.....	120,000	—	5,807
	1,317,000	—	368,379

The quantity of gold-dust delivered by the escorts from our several gold-fields during the month of May amounted to 27,058 ozs. For the corresponding month of the year 1863 the receipts reached 34,414 ozs. The decrease in the month is, therefore, 7,356 ozs., or 21½ per cent. During the first five months of the present year the quantity of gold received by the escorts amounted to 131,070 ozs. For the same period of the year 1863 the amount was 192,641 ozs. The decrease on the five months is therefore 61,571 ozs., or about 32 per cent. The diminution in the yield of our gold-fields is still attributable to the small quantities that are now received from Forbes, Burrangong, and Braidwood, as compared with last year. The quantity of gold having decreased so considerably, the Government have made the escorts fortnightly instead of weekly. From some of what were formerly considered minor gold-fields the returns show an improvement, and this is particularly the case with Orange and Stony Creek. The following table will show the quantities of gold-dust received monthly by the Western, Southern, and Northern escorts during the first five months of the years 1863 and 1864:—

1863.	Western.	Southern.	Northern.
	oz.	oz.	oz.
January .....	29,942	21,531	4,455
February .....	18,371	14,902	2,479
March .....	12,914	12,075	2,491
April .....	22,591	12,812	3,664
May .....	17,608	14,152	2,654
	101,426	75,472	15,743
1864.			
January .....	11,471	10,764	2,380
February .....	13,243	10,377	1,248
March .....	16,202	13,943	3,158
April .....	11,736	10,363	2,127
May .....	14,659	9,803	2,596
	64,311	55,250	11,509

It will be seen from this table that the decrease from the Western gold-fields is 27,115 oz., or 36½ per cent.; from the Southern, 20,222 oz., or 27 per cent.; and from the Northern, 4,234 oz., or 27 per cent.

### Publications Issued.

ETUDES SUR L'HISTOIRE DE L'ART—ANTIQUITE—MOYEN AGE—TEMPS MODERNE.—Studies relative to the History of Art. Four vols. 18mo. (*Michel.*) M. Vitet, one of the elder lights of the French Academy, and whose dissertations on Art have made his name known throughout Europe, has just published four small volumes of very valuable materials for the use of whoever may dare to grapple with that gigantic subject—the history of art. M. Vitet recognises the great labour of Winckelmann, and accords him the honour of the bold idea of a History of Art, but he points out the evident incompleteness of the work, as well as the errors which later investigations in the same field have brought to light, and he arrives at the conclusion that a complete History of Art is a labour which none but a literary Hercules should venture to undertake. This being the case, the world must be satisfied with what M. Vitet offers, namely, a collection of essays, most, if not all of which have been published before in the *Revue des Deux Mondes* and elsewhere, but which well deserve to be presented, as they now are, in a collected form. The following are some of the best-known and most important items of the contents:—Pindar and Greek Art—The Eleusinian Marbles—Athens in the fifteenth, sixteenth, and seventeenth centuries—The Campana Collection, specially interesting since its dispersion and the exhibition of a great portion of it in the Louvre—The Roman Christian Mosaics. The Middle Ages are elaborately treated from documents and traditions of “Notre Dame de Noyon,” and in papers on “The Architecture of England,” “The Historic Monuments of the North-west of France,” and other special subjects. Modern Art is examined in essays on painting in Italy, France, and the Low Countries; religious music, dramatic music, a celebrated study of the works of Eustache Lesueur, and another equally well known, entitled “Raphael at Florence.” The collection includes critical notices of the productions of recently deceased masters, as Delaroche, Ary Scheffer, Delacroix, down to Flandrin. One of the most interesting portions of the collection is that which treats of the famous fresco of Saint Onorio, to which M. Vitet devotes nearly a hundred pages. This work was discovered about twenty years since, veiled beneath the smoke and dirt of a Florentine atelier, and has called forth much critical discussion. M. Vitet adopts the conclusion of M. Jesi, who, in the height of his enthusiasm, declared they might put him to the rack without making him deny that the work was Raphael's. He would not permit the great painter himself, could he revisit this world, to say it was not his. “You may have your reason,” he would say to him, “for disowning it, but that fresco is certainly yours.” M. Vitet has his peculiarities—what man of mark has not? and one of them is a rather contemptuous disregard for the works of the esthetical school, and this is not unlikely to be the cause, or at least one of the causes, why the young essayist has perferred to give the world the result of his labours in a collection of brilliant and valuable fragments, rather than in the form of a complete and harmonious history. Had such a critic and essayist as M. Vitet been of an esthetical turn of mind, he could scarcely have avoided writing a history of some, if not all, of the great eras of art.

### Notes.

RAILWAY BRAKES.—Considerable attention has been given on the Continent, of late, to the means of stopping

railway trains. A series of experiments was made the other day on the Sambre-et-Meuse Railway, with a new brake, invented by M. Micás. The movement is transmitted with great rapidity by a single brakeman, and by means of a simple lever, without any screw; its mode of action is the pressure of a wooden shoe against the wheels, in such a manner that the latter are raised from contact with the rail to a distance of not more than the twelfth of an inch. The experiments were conducted under the eye of M. Gobert, the Government railway engineer, and in the presence of several engineers of other lines. The results are given as follows:—A train, without an engine, and weighing 195 tons, was started on an incline of 1 in 140—at a speed of seven miles an hour; the train was brought to a stand-still by two brakes, at 230 yards; at the rate of ten miles and a half per hour, at 282 yards; and at twenty-one miles an hour, at 325 yards. The two brakes were coupled and worked by one man. The next trials were made also with two brakes, but disconnected, and worked by two men. At eighteen and a half miles per hour the train was arrested at 190 yards. The next experiments were made on a level portion of the line, with a train driven by a powerful engine at the rate of thirty-three miles per hour; a single brake brought it to a stand-still at 433 yards, and two brakes at 190 yards.

**SAFETY APPARATUS IN FOUL AIR.**—M. Galibert, of Paris, has invented two apparatuses to enable persons to enter, without danger of suffocation, places where choke-damp or foul air may exist; and their simplicity and ingenuity demand for the inventor a hearing. One of these arrangements is intended for use at short distances only from the outer air. It consists of a mouthpiece of horn, ivory, or wood, pierced in two places for two india-rubber tubes, of the length required by the circumstances, fitted to the mouthpieces above mentioned, and provided within with spirals of metallic wire, to prevent collapse, and of a small instrument to nip the nose, and prevent respiration through that organ. The mouthpiece is provided with a projection which is held between the teeth; the lips close around and exclude the surrounding air, and the operator draws fresh air through one tube while he exhales that used by the lungs through the other. The tongue performs the part of a valve covering the two holes in the mouthpiece alternately, and it is said that after a few seconds the action becomes perfectly easy, and as it were natural. Where the distance is at all considerable, and, consequently, the drag of the tubes considerable, the mouthpiece may be held in place by means of a band; and, in the case of the presence of gases irritating to the eyes, a hood with glass in front is to be added. The other apparatus is for use in places further removed from the open air. In this the tubes are replaced by an air-bag carried by the operator. The same mouth and nose pieces are used, and short tubes communicate with the bag, which is fixed on the back by means of braces or straps; the latter is made in the form of a Spanish wine-skin, and contains when inflated about seventeen gallons of air; one end of the aspiration tube is connected with the lower part of the air-bag, and that of the respiration tube with the upper end of the bag, so that while the warm air from the lungs occupies the upper portion of the bag, the diver, as he may be called, draws fresh air from the bottom. The inventor says that such a bag will suffice for a man's respiration for half-an-hour, the same air passing without danger several times through the lungs. In cases where the duty to be performed occupies a longer time, the operator is provided with extra bags, to take the place of those which are exhausted, or with a second apparatus; and in certain cases these may be drawn out and replaced by others from without. The apparatus is also mentioned as available in cases where medical men recommend total immersion, as a patient could with it breathe freely from the bottom of a bath. M. Galibert's invention has been extensively approved and adopted; it has been reported

upon by the Société d'Encouragement of Paris, and by the engineer-in-chief of the School of Mines; and it is in use in the municipal service of Paris, in the Spanish mines of the Credit Mobilier, the mines of Douchy, by the Parisian Gas Company, and many other establishments. The other day M. Galibert, armed with his apparatus, descended into a cellar filled with the fumes of burnt resinous substances, at the barracks of the Pompeurs, in the Rue du Chateau d'Eau, in the presence of General Uhrich and all the officers of the corps, and remained there a considerable time without exhibiting the slightest symptoms of suffering.

**HÔTEL DIEU.**—It will be remembered, that a week or two since the Emperor issued a decree, in the form of a letter from Vichy, addressed to Marshal Vaillant, the Minister of the Imperial Household and of Fine Arts, to the effect that the rebuilding of the famous hospital, *l'Hôtel Dieu*, should be commenced as soon as possible, and that the works of the new opera should be delayed in order that the two new edifices should be completed and crowned at the same time. "I feel it very important, in a moral point of view," says Louis Napoleon, "that the monument dedicated to pleasure should not be raised before the asylum of suffering." This Imperial order has of course been put in train for execution without loss of time. The Hôtel Dieu of Paris is certainly one of the most celebrated establishments of the kind in the world, and in the pre-philanthropic age, before the time of the Howards and Frys, it was looked upon as a model, and deservedly so. At present its relative position is changed, and for many years it has been in a terrible condition, its position rendering much improvement impossible. The draft-plans for the new building are prepared. It will be built on the island on which the old one stands, but on the other side of it, and will in fact occupy nearly the whole of the space between the Quai Napoleon and the Place du Paroiss Notre Dame on the one hand, and between the Rue de la Cité and the Rue d'Arcole on the other. The new hospital will form a quadrangle, covering about 2,200 square mètres, or about twice the space occupied by the old one and its dependencies.

## Patents.

*From Commissioners of Patents Journal, September 2nd.*

### GRANTS OF PROVISIONAL PROTECTION.

Aniline, producing colour from—1949—A. H. A. Pfughaupt.  
 Arches, floors, &c., blocks for the construction of—2005—H. Pether.  
 Bricks, ornamental—1009—F. Potts and C. Harvey.  
 Chronographe, electro-balistie—1840—P. E. Le Boulengé.  
 Croquet, articles used in the game of—1894—H. McEvoy.  
 Dyeing and printing—1409—E. J. Hughes.  
 Dyeing and printing, colouring matter for—1867—A. Dalzell.  
 Hammocks, method of slinging—1644—E. T. St. Lawrence McGwire.  
 Horsehair, preparation of sorgho plants as a substitute for—2039—C. F. Darcagne.  
 Languages, apparatus to facilitate the acquisition of—1944—A. Long.  
 Mashing apparatus, self-acting—1177—J. Roy.  
 Ordnance and gun carriages—1372—R. A. Brooman.  
 Paper, presses for stamping or embossing—2017—W. Jones.  
 Ships, construction of—1033—T. H. Holderness and H. Jordan.  
 Submarine works, construction of—2041—B. B. Stoney.  
 Tapes, webbings, bands, ribbons, &c.—1942—J. and M. Radcliffe.  
 Vegetable fibres, treatment of—1031—B. F. Brunel.  
 Vessels for naval and merchant service—1450—A. Walker.  
 Wringing and mangling—1675—J. B. Howell.

### INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Boots and shoes, manufacture of—2113—G. Haseltine.  
 Floor cloth—2084—A. Ford.

*From Commissioners of Patents Journal, September 6th.*

### PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

2163. J. Harris.	2213. F. Bennett.
2156. R. Shaw.	2203. F. E. Schneider.
2206. R. McConnel.	2243. R. O. White.
2211. P. Effertz.	2261. J. Bowms.

### PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

2290. T. Bradford.	2362. J. Harrison.
2299. E. Leigh.	